REMARKS

Applicants would like to thank the Examiner for the indicated allowability of the subject matter recited in claims 6 and 17 and respectfully request reconsideration and allowance of the remaining claims in view of the above-amendments and the following remarks.

I. CLAIM REJECTIONS UNDER §112

Claims 6 and 17 were rejected under §112, second paragraph, as being indefinite for not clearly defining "d".

Accordingly, claims 6 and 17 are amended to define "d(i,j)" as a matching matrix. In view of this Amendment, Applicants respectfully request that the rejection of claims 6 and 17 under §112 be withdrawn.

II. CLAIM REJECTIONS UNDER 102

The remaining claims were rejected under §102 as being anticipated by Sasagawa et al., U.S. Patent No. 6,784,574, Scepanovic et al., U.S. Patent No. 6,292,929, Scepanovic et al., U.S. Patent No. 6,134,702 or Gasanov et al., U.S. Patent No. 6,637,016.

A. **Independent Claims 1 and 12**

As amended, independent claim 1 includes the step of:

a) creating an initial object assignment to points of the first rectangle;

b) dividing the first rectangle into a plurality of second rectangles;

c) applying an object assignment procedure, which is different than the initial object assignment procedure, to the initially assigned objects in each second rectangle.

For example, in one embodiment described in the specification on pages 5-7 with reference to FIG. 2, the initial object assignment is performed on the total rectangle using a relatively fast optimization procedure using, which minimizes a maximal cost of assignment. Dependent claims 2-6 address some details of the fast optimization procedure.

The total rectangle is then divided into a plurality of second rectangles, and a stronger optimization procedure (e.g., Kuhn's algorithm) is applied to each second rectangle. It has been found that due to the complexity of the Kuhn algorithm, the time required to perform the Kuhn algorithm to all of the small rectangles is significantly shorter than the time required to apply the Kuhn algorithm of assignment to the total rectangle.

Claims 1 and 12 are amended to emphasize that different assignment procedures are utilized before and after dividing the rectangle into smaller rectangles.

Of the references cited in the Office Action that divide rectangles, these references use iterative dividing, where one rectangle is divided into several second rectangles, each second rectangle is divided into several third rectangles, etc. To each of these rectangles, the same procedure is applied.

B. Sasagawa et al. '574

Claims 1, 7, 11-12 and 17-18 were rejected under §102(e) as being anticipated by Sasagawa et al. '574.

Applicants assume that claim 17 was mistakenly included in this list of rejected claims.

1. <u>Claims 1 and 12</u>

Sasagawa et al. disclose a method of determining an optimal uniform-density layout in which an initial layout is obtained in a predetermined region. A linear combination of a first and second objective functions (representing various conditions) is generated as a third objective function. The third objective function is then optimized by executing an iterative-improvement algorithm on the third objective function using the initial layout as an initial solution.

The subregions shown in FIGs. 12a and 12b are used in a procedure for generating a function related to a population density of the object elements. (Col. 23, lines 15-38). The iterative improvement algorithm is described in column 24, line

53 to column 26, line 19. It appears from this description that the iterative improvement algorithm is performed on the entire initial layout.

Sasagawa et al. do not disclose the steps of creating an initial object assignment to points of a first rectangle, dividing the first rectangle into a plurality of second rectangles, and applying an object assignment procedure to the initially assigned objects in each second rectangle, as described in independent claim 1.

In addition, Sasagawa et al. do not disclose the step of applying a different object assignment procedure to the initially assigned objects in each second rectangle, as recited in amended claim 1.

Claim 12 includes similar limitations. Since Sasagawa et al. do not disclose each and every element of independent claims 1 and 12, and thus their respective dependent claims, Applicants respectfully request that the rejection of claims 1, 7, 11-12 and 17-18 under §102(e) based on Sasagawa et al. be withdrawn.

In addition, the dependent claims add additional features that are not taught by Sasagawa et al.

2. Dependent Claims 7 and 18

Claims 7 and 18 require that the first rectangle be divided so that each point in the first rectangle is in at least two second rectangles.

An example of such second rectangles is shown in FIG. 3 of the present application. In this example, a rectangle R is divided into 41 small rectangles, 16 rectangles shown in the upper portion of FIG. 3 and 25 more rectangles (which overlap the 16 rectangles) shown in the lower portion of FIG. 3. Thus, each coordinate point in the rectangle R is in at least two of the smaller rectangles (one rectangle in the top portion of FIG. 3 and another rectangle in the bottom portion of FIG. 3).

Sasagawa et al. do not disclose such a division of rectangles.

C. **Scepanovic et al., U.S. Patent No. 6,292,929 and Scepanovic et al., U.S. Patent No. 6,134,702.**

Claims 1-7, 11-16 and 18 were rejected under §102(b) as being anticipated by Scepanovic et al., U.S. Patent No. 6,292,929, and claims 1, 7, 11-12 and 18 were rejected under §102(b) as being anticipated by Scepanovice et al., U.S. Patent No. 6,134,702.

1. <u>Independent Claims 1 and 12</u>

The Scepanovic '929 and '702 patents use iterative dividing in which one rectangle is divided into several second rectangles and then each of the second rectangles is divided into third rectangles. To each of these rectangles, the same procedure (not different procedures) is applied.

Thus, claims 1 and 12 and their respective dependent claims are not anticipated by the Scepanovic et al. patents.

2. <u>Dependent Claims 2-5, 13-16</u>

With respect to claims 2-5 (and similar claims 13-16) the Scepanovic et al. '929 patent does not disclose the elements of these claims. Claims 2-5 provide further details of the initial object assignment recited in step a) of claim 1.

The Office Action directs the Applicants' attention to FIGS. 1 and 31-32. FIG. 31 illustrates an iterative procedure, which calculates a cost function, such as wire length on each iteration and then computes an average cost value at step 655.

FIG. 32 illustrates a dispersion-levelizing system having the step of iteratively recalculating moveable node coordinates to minimize cost function density dispersion and a step of adjusting coordinates to minimize a local cost function.

However, claim 2 of the present application is in the context of creating an initial object assignment to points of a

first rectangle, wherein an assignment of objects to points is selected that has a minimum value of a maximal cost.

Scepanovic et al. '929 patent does not disclose a minimization of "a maximal cost", particularly with an initial assignment procedure. The cited portion of Scepanovic deals with an "average" cost. Further, the Scepanovic patent does not disclose use of a midpoint to a maximal cost and steps of recalculating minimal and maximal costs as recited in dependent claims 3, 4 and 5.

3. Dependent Claims 7 and 18

The Scepanovic et al. patents do not disclose the particular method of dividing a rectangle recited in dependent claims 7 and 18, described above.

D. **Gasanov et al., U.S. Patent No. 6,637,016**

Claims 1 and 12 were rejected under 102(b) as being anticipated by Gasanov et al. U.S. Patent No. 6,637,061.

The Office Action directs Applicants' attention to FIGS. 4-7. FIG. 4 illustrates a grid or lattice on a semiconductor surface used for assigning cell coordinates. FIG. 5 is a flowchart, which illustrates placement steps performed according to the disclosure. Nowhere does Gasanov et al. disclose the steps of creating an initial object assignment to points of a first rectangle, dividing the first rectangle into a plurality of second rectangles, and applying an object assignment procedure, different from the initial assignment procedure, to the initially assigned objects in each second rectangle.

Applicants therefore respectfully request that the rejection of claims 1 and 12 under §102(e) based on Gasanov et al. be withdrawn. Claim 12 includes similar limitations.

III. CLAIM REJECTIONS UNDER §103

Claims 8-10 and 19-21 were rejected under §103(a) as being unpatentable over one or more of the above-cited references

in view one or more of La Mura, U.S. Publication No. 2005/0038728 and Hill et al., U.S. Publication No. 2004/0166864.

The La Mura and Hill publications were cited as disclosing the Kuhn algorithm. The La Mura publication relates to "double auctions with bargaining," and the Hill et al. publication relates to "minimizing signal interferences within a wireless network".

Even if the references were combined as suggested in the Office Action, the resulting combination would still fail to teach or suggest all of the elements of independent claims 1 and 12 and their various dependent claims for the reasons discussed above. Therefore, Applicants respectfully request that the rejection of claims 8-10 and 19-21 under §103(a) be withdrawn.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: David D. Brush

David D. Brush, Reg. No. 34,557
Suite 1400 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

DDB:tkj